"A study of Resemblance of Gravitational Waves with the Pre-primary waves of Earthquake".

Synopsis

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1. INTRODUCTION:

The devastating earthquake, of Killari, in Latur district on 30th September 1993 caused about 75 thousands causalities is an internationally known event from SRTMU area. We came across several cases of unusual behaviour of animals, birds, fishes; particularly of snakes, rats and peacocks from this area observed prior to this quake. It was verified to be reported before all major earthquakes, around the globe.

Classically, earthquake begins with the Primary or Push waves also designated as "P" waves; followed by Secondary – Shake or "S" waves. These are body elastic waves as their propagation depends upon elastic properties, i.e. Young's Modulus, bulk modulus and sheer modulus of the material of earth.

The body elastic waves, like sound waves, produce transverse and longitudinal vibrations of particles of material and propagated from within the earth .They carry mechanical energy, which is responsible for devastation and deaths due to collapsing buildings and structures.

The body elastic waves, after reaching the surface of earth, produce vibrations on the surface, discovered by a British Physicist, noble laureate, Lord Rayleigh. The surface waves, as such, are named after him as Rayleigh waves. They are also mechanical and destructive. There is no seismographic indication, of significant magnitude prior to earthquake, corresponding to strange behaviour and mass migration of creatures away from Epicentre of earthquake.

We have named the phenomena of animal precursors of major earthquake as "Psycho-seismic" signals in the paper submitted at 100th Indian Science Congress, held at Kolkata[1] in 2013. An Indian Copyright was also obtained for Psycho-seismic signals[2].

The Psycho-seismic signals are attributed to, what is defined as Pre-primary waves of earthquake. They are not likely to be mechanical like Primary, Secondary and Rayleigh waves hence do not damage buildings, but they certainly perturb animals, birds and fishes.

Few human beings are also reported to be supersensitive so as to share animal precursors of major earthquakes. We came across one such Psycho-seismic person

Mr.Sudhakar Kedari[3], who resides at Ahmednagar in Maharashtra, his detailed interview is published in Marathi newspapers viz. in *Ekmat* Dt.29th May 2001, published from Latur.

Mr. Kedari appears to have developed, purposefully, his faculty of Pre-cognition of earthquake. It is rather intuitive, that he feels, in advance, about imminent major earthquakes, he has supplemented his intuition by detail observation of nature and creatures around.

He feels some sort of sensation from the bottom of his legs hence he generally moves bare-footed and he could fore-tale the rough magnitude and the country in South hemisphere where earthquake is going to struck.

He made hectic efforts to communicate Gujrath Government and media, when he received natural signal about the devastating quake, that stuck Gujrath on 26th January 2001, but nobody responded him.

According to him, besides tectonic movements, extensive oil extraction could also be a cause that adds to the vulnerability of certain area towards earthquake. He has proposed certain astronomical links between Phases of Moon and earthquakes. Standard geophysical techniques, such as micro-zonetion, are already developed to identify high risk zones. But there are no reliable methods other than *Psycho-seismic vigilance*, for "Short-term predictions" required as life saving device, for pre-disaster mitigation in respect of major earthquakes.

It was revealed during this interview that the grandfather of Mr.Kedari use to understand the language of birds. Mr. Kedari's experiences about pre-cognition of earthquake are published in the form of a book in Marathi[4].

Another Psycho-seismic person. Jim Berkland, an American, has also published his experiences in the form of a book titled "The Man who predicts Earthquakes" (www.sentientpublications.com).

Such persons are reported from Andaman, Kandla port (Gujrath), Indonesiya etc. The proposed Pre-primary waves are predicted to have very high velocity as compared to

the body elastic waves so that they reach the surface of earth ahead of the body elastic waves.

A mathematical model, with illustration is presented (Fig.-2, Ref.1).

2. REVIEW OF LITERATURE AND DEVELOPMENT IN THE SUBJECT:

Waves of Gravity and Pre-primary waves:

A landmark event in Physics is the detection of Gravitational Waves by Laser Interferometer Gravitational Observatory (LIGO) on 14th September 2015, produced 1.33 billion years ago due to coalesce of binary Black Holes, known as GW150914.

This is directly concerned with SRTMUniversity as the India LIGO project is being established at Aundha Nagnath in Hingoli district in SRTMU area[5] and SRTM is one of the participants in this project. Besides presentations on Gravitational Waves at 104th & 105th Indian Science Congresses **[6-8]**, we have actively participated in sessions on Gravitational Waves and published several articles in Marathi; introducing Gravitational Waves to common readers a few samples are enclosed**[9-12]**.

There are glittering similarities between the hypothecated Pre-primary waves, and the recently detected Gravitational Waves. The Gravity waves and proposed Pre-primary waves are similar in the sense that they don't disturb, mechanically, the atoms, molecules or crystals of the medium through which they travel. Both of them originate due to ancient matter compressed under very high pressure and temperature, isolated from environment, in black holes or in the core of earth.

Unlike black holes, however, the core of earth does not prohibit anything to come out .It allows energy to flow or eject out of it, that includes a form of energy which re-structures the space-time within and surrounding it.

The extent of re-structuring in case of earth-core is not as high as in the case of black holes, so that the Pre-primary wave does not travel at speed of light, Its speed yet could be enough to produce Gravitational type of waves that could move at very high speed as compared to body elastic waves, hence could reach the surface of earth almost instantaneously and produce psycho-seismic effects while body elastic [mechanical]

waves of earthquake move very slow and delayed to reach surface as they could move at a maximum speed of 15 Km/sec only.

It is further hypothesized that the magneto-hydrodynamic equilibrium between the core of earth and the surrounding magma or between the inner and outer cores is slightly disturbed due to solar flares or any such external or internal reason, so that a collision or friction between the core and magma or between inner and outer core happens.

This leads to generation of *Gravity type* Pre-primary waves. The Gravitational Waves accordingly provide a scientific interpretation for existence and propagation of Pre-primary waves leading to Psycho-seismic precursors which have been so far treated as myth.

3. OBJECTIVES OF THE RESEARCH / PROPOSED HYPOTHESIS

Journals and Research papers on concerned topics are available at IUCAA, Pune & IISc, Banglore and data could be obtained from the international project of Anglia Ruskin University, Cambridge[13] and these are the main sources of information.

Besides, it is recommended strongly for developing the premises around LIGO India into a bird sanctuary, so that the study of Gravitational waves in context with their impact on birds, particularly peacocks may be *locally* undertaken.

LIGO (USA) has released some images on their official website with data that clearly indicates graphical similarity between Gravitational and the earthquake waves[**14**]. Signals from satellite are supposed to be most reliable amongst physical methods. There was nobody at receiving end when American satellite had the indications of Latur earthquake[15].

Now ISRO is launching hundreds of satellites, appropriate instruments for intimation of earthquake could be installed on them and their data could be co-ordinated with LIGO-India, if an official participant in LIGO India like SRTMU recommends for appropriate programming.

The derivations related to Pre-primary waves are based on the Theory of Relativity. Modified form Special Theory of Relativity[**16**] as Gravitational Lorentz

Transformations[17] is used for derivation of relativistic equation for Pre-primary waves producing Psycho-seismic signals (2013) of major earthquake.

This is required to be reviewed on the basis of General Theory of Relativity as Coalesce of black holes was predicted by Albert Einstein and C.V. Vishveshshwara[18] from Banglore on the basis of General Theory.

$$x' = \frac{\Omega x - ut}{\sqrt{1-\left(\frac{u}{c\Omega}\right)^2}} \qquad \text{and} \qquad t' = \frac{\Omega t - \frac{ux}{c^2}}{\sqrt{1-\left(\frac{u}{c\Omega}\right)^2}}$$

Another recent international experiment in physics which has deep impact on mankind and knowledge is the discovery of an elusive particle predicted by Indian Physicist Satyendra Nath Bose in 1925, popularly known as "God Particle". It was detected in July 2012 at world's biggest physics lab, located in Europe called as Large Hadron Collider (LHC).

Production of new tiny particles during high energy collision[19] is actually confirmed by LHC. Collisions involving much higher magnitude of energies are happening in cosmos and in the core of earth. The conditions of matter in the core are somewhat similar to the matter trapped in black holes.

There is every possibility that such high energy events may generate flux of tiny particles of the type of neutrinos, which can penetrate the magma and even hard crust of earth without interacting with the material through which it travel.

This propagation is similar to that of the hypothecated Pre-primary waves, it could then be a type of "*particle analogue*" of Pre-primary waves, this type of neutrinos, if interact with neurons of species, then they could also produce Psycho-seismic effects. Such particles as they could be utilized as life saving device, are named as "angel particles[20].

$$E = T_{u_T} + \int_{u_t}^{u_x} F du + \Sigma \left[\frac{d}{dt} p \right]_j$$

Where $\Sigma \left[\frac{d}{dt} p \right]$ represents creation of new particles

4. METHODOLOGY TO BE ADOPTED:

Application of Special and General Theories of Relativity, with appropriate modifications, in context with Gravity waves is our main theoretical methodology of this work.

The Gravitational Waves (GW) recently detected by LIGO , carry a form of energy which is qualitatively different is from the hitherto known forms {of energy} , in the sense that GW are shock waves which transfer energy through the vibrations of space-time frame itself.

Unlike sound and light waves, GW are propagated without disturbing the particles of the medium through which they are propagated. This mode is very much similar to the vibrations felt by animals-birds-fishes ahead of major earthquakes. Detection of GW hence point out to the possibility of the existence of what could be defined as the “Pre-primary” (PP) waves of earthquake.

The other resemblance between GW & PP is the role of ancient matter sealed in black holes and in earth’s core that could generate waves similar to GW. This research is aimed at substantiating behaviour of animals-birds-fishes immediately before major earthquake, in context with the Gravitational Waves. An explanation based on Theory of Relativity is presented for PP waves, so as to render confidence for effective pre-disaster mitigation with respect to imminent major earthquake.

Besides drastic changes in physical parameters like density and temperature, the “ancientness” of captive matter inside the core of earth is hypothesised to involve certain difference in degree of evolution, which is responsible for producing psycho-seismic effects. Angel particles are the *analogue of PP waves* they are like type of Neutrino that

interacts with neurons of species to produce Psycho-seismic effects, this interaction may be explained on the basis of quantum biology.

5. IMPORTANCE OF STUDY:

It has been an endeavour of scientific community to design a reliable alarming system for intimation of earthquake. Effects of stress accumulated in tectonic plates with its heating and electromagnetic effects have been so far used as indicators for this purpose; they are classified according to their origin (Fig-1, Ref.-1). We have designed a website on intimation of earthquake, on the occasion of the Year of Physics 2005[21].

Pre-primary waves are qualitatively different from the other indicators, as they depend on stress in space-time and not in tectonic plates. Analogy between Gravitational and Pre-primary waves, as an outcome of this research would provide strong theoretical support for monitoring animal precursors for effective pre-disaster mitigation in respect of major earthquake.

An international-interdisciplinary project, based on animal precursors, is taken up by Anglia Ruskin University, Cambridge, London. They are conducting experiments in a jungle in "Peru" in South America[13]. We would persuade the authorities to take up similar project, may be in collaboration with the International Team of Anglia Ruskin University, to examine the possibility of additional use of LIGO India project for intimation of earthquake, as they would be installing a very sensitive seismographic establishment at LIGO-India for filtering out the vibrations from within the earth.

A direct consequence of the similarity between waves of gravity and that of Pre-primary waves is need to recognize animal precursors as a scientific warning of an imminent major earthquake[22-25].

The detection of Gravitational waves is urged to create faith amongst scientific community about the possibility of psycho-seismic signals that could precede the destructive energy waves, of earthquake, so as to develop political will, administrative desire and social awareness leading to effective alarming systems for major earthquakes. This is the applied value of this proposed research work.

6. PROPOSED WORK PLAN:

The present work aimed to study of Resemblance of Gravitational Waves with the Pre-primary waves of Earthquake which is broadly elaborated in three consecutive years is depicted as follows:

First Year:-

1. To collect the references in relevant field.
2. To attend the seminars/ conferences/ workshops on relevant topic.
3. To study the various papers and finalize one of the schemes of study.

Second Year:-

1. To study the existing and new techniques which will be applied in our research work?
2. Establishing a correlation between data obtained from various sources with mathematical derivations designed on facts of theoretical physics and relevant information collected personally.
3. Information based on self experiences will also be associated with pre disaster mitigation in respect of earth quake.

Third Year:-

1. To publish the work in reputed peer reviewed international journals.
2. To compile the data for thesis writing and eventually the thesis will be submitted to the concerned authority.

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